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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,719	05/25/2004	Ming Tang	13114-US-PA	3718
31561	7590	03/01/2006	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE			WEISS, HOWARD	
7 FLOOR-1, NO. 100			ART UNIT	
ROOSEVELT ROAD, SECTION 2			PAPER NUMBER	
TAIPEI, 100			2814	
TAIWAN			DATE MAILED: 03/01/2006	

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/709,719

Applicant(s)

TANG, MING

Examiner

Howard Weiss

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 34-36 and 38-51 ~~is/are~~ are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 34-36 and 38-51 ~~is/are~~ are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: 13114-US-PA

Filing Date: 5/25/04

Continuing Data: none

Claimed Foreign Priority Date: none

Applicant(s): Tang

Examiner: Howard Weiss

Claim Objections

1. Claim 34 recites the limitation "the pillar" in Line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 34 to 36, 38, 43 are 46 to 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (U.S. Patent No. 5,252,845).

Kim et al. show all aspects of the instant invention (e.g. Figures 5 to 7) including:

- forming a deep trench capacitor in a substrate **101**
- defining an active area with a semiconductor pillar **113** and isolation area
- forming a buried strap **112** via out-diffusion of dopants from inner electrode **108** and in a lower portion of said pillar
- forming a gate dielectric **115** on said pillar and a word line **116** on at least three sidewalls of said pillar
- forming a source/drain region **114** on said pillar and a bit line **118** connected to said source/drain region
- using a masking layer **107** which overlap the capacitor

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 39 to 42, 44, 45, 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. and Hisamoto et al. (IEDM 91).

Kim et al. show most aspects of the instant invention (Paragraph 4) except for using the word line as a mask in forming the device and the top of the word line is lower than the top of the pillar. Hisamoto et al. teach (e.g. Figure 1) to use the word line as a mask and to have the top of the word line lower than the top of a pillar to reduce noise due to minority carriers (see last paragraph). It would have been obvious to a person of ordinary skill in the art at the time of invention to use the word line as a mask and to have the top of the word line is lower than the top of the pillar as taught by Hisamoto et al. in the process of Kim et al. to reduce noise due to minority carriers.

Response to Arguments

6. Applicant's arguments filed 12/28/05 have been fully considered but they are not persuasive. The Applicant states that Kim et al. fail to teach a word line with a multi-gate which surrounds the pillar one at least three side. However, Figures 6 and 7 of Kim et al. clearly show the word line surrounds the pillar on at least three sides of the pillar. Figure 6 shows the word line on two sides of the pillar and Figure 7 shows the word line on the other two sides. In reference to Hisamoto et al. teaching the source/drain in the lower portion of the pillar, Kim et al. show this configuration. In view of these reasons and those set forth in the present office action, the rejections of the stated claims stand.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).
9. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the

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hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via Howard.Weiss@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

11. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/243	thru 2/24/06
Other Documentation: none	
Electronic Database(s): EAST	thru 2/24/06



HW/hw
24 February 2006

Howard Weiss
Primary Examiner
Art Unit 2814